Journal of Cardiovascular Disease Research

ISSN: 0975-3583,0976-2833 VOL15, ISSUE 09, 2024

# CASE SERIES ON PERIPARTUM CARDIOMYOPATHY

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Received Date: 20/08/2024 Acceptance Date: 24/09/2024

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## Abstract

**Background:** Peripartum cardiomyopathy is a rare cause of heart failure that occurs during late pregnancy or in the early postpartum period. Delays in diagnosis may occur as symptoms of heart failure mimic those of normal pregnancy. The diagnosis should be considered in any pregnant or postpartum woman with symptoms concerning for heart failure. All women with peripartum cardiomyopathy should have close follow-up with a cardiologist, although optimal duration of medical therapy following complete recovery is unknown. Women considering a subsequent pregnancy require preconception counseling and close collaboration between obstetrics and cardiology throughout pregnancy. **Aim And Objective:** The study aimed to analyze the presentation, complications, pregnancy and fetal outcome in both antepartum and postpartum patients and examine their management. **Materials And Methods:** This prospective observational study was conducted at the Department of Obstetrics and Gynecology, Sri Ramachandra Institute of Higher Education and Research for a total duration of 2 years from March 2022 to February 2024. Clinical data, including age distribution, gestational age at presentation, parity, presenting symptoms and identifiable risk factors was collected. **Summary:** 65% patients are booked while the rest 35% are unbooked. 80% patients fall under the age group of 21-30 years. 70% patients were antenatal mothers.80% were singleton pregnancies where as 20% were multiple pregnancies. 65% fall under overweight BMI category. 55% come under NYHA Grade 1.55% had assosciated pre-eclampsia/eclampsia;50% had assosciatedanaemia;20% had assosciated chronic hypertension.45% patients had ejection fraction of 21-30% and 10% had ejection fraction of 10-20%. There was 1 maternal mortality due to cardiac arrest. There was 1 IUFD and 2 neonatal deaths. Conclusion: PPCM is a diagnosis of exclusion. Aggressive medical and obstetric management is crucial for a good outcome. Even after a complete recovery, successive pregnancies entail a30% chance of relapse. Women who have had PPCM in a previous pregnancy should be extensively assessed, and those who have persistent left ventricular dysfunction should avoid additional pregnancies.

## Introduction

Peripartum cardiomyopathy (PPCM) is a rare, idiopathic, and often dilatedcardiomyopathy that is marked by systolic dysfunction that presents in late pregnancy or the early postpartum period.

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A workshop convened by the US National Heart, Lung, and Blood Institute (NHLBI) in the 1990s defined PPCM as heart failure that develops in the last month of pregnancy or up to five months postpartum with left ventricular systolic dysfunction (left ventricular ejection fraction (LVEF) <45%or fractional shortening <30%, or both).

However, a large proportion of patients who otherwise meet the criteria for PPCM present before 36 weeks gestation, raising concerns that the NHLBI definition may be overly restrictive and lead to the under diagnosis of PPCM. Given this concern, in 2010 the European Society of Cardiology (ESC) defined peripartum cardiomyopathy as heart failure that occurs "towards the end of pregnancy or in the months following delivery, where no other cause of heart failure is found."

Its clinical outcome is also diverse from complete recovery to death. Postpartum cardiomyopathy is a diagnosis of exclusion.

The current diagnostic criteria for peripartum cardiomyopathy include:

1. Cardiac failure in a previously healthy woman in the last month of pregnancy or within 5 months of delivery.
2. Absence of a determinable etiology for the cardiac failure.
3. Absence of demonstrable cardiac disease prior to last month of pregnancy. 4. Echocardiographic evidence of diminished left ventricular systolic function(less than 45%).

**Aim And Objective:**

The study aimed to analyze the presentation,complications,pregnancy andfetal outcome in both antepartum and postpartum patients and examine their management.

**Materials And Methods:** This prospective observational study was conducted at the Department of Obstetrics and Gynecology, Sri Ramachandra Institute of Higher Education and Research for a total duration of 2 years from March 2022 to February 2024. . Clinical data, including age distribution, gestational age at presentation, parity, presenting symptoms and identifiable risk factors was collected.

**Inclusion Criteria:** 1) Emergence of heart failure symptoms in the last month of pregnancy (>35weeks of pregnancy) or within first 5 months of delivery. 2) With no eveidence of heart failure.

**Exclusion Criteria:** Preexisting ischeamic heart diseases, congenital heart diseases and prior known cardiomyopathies were ruled out.

**Study Methodology:**

A total of 20 patients with Peripartum Cardiomyopathy were included in the study Data were obtained from the hospital's case files and medical records. All patients diagnosed with PPCM were managed by an interdisciplinary team approach consisting of obstetricians, cardiologists, anaesthesiologists and neonatologists. Demographic profile, obstetric comorbidities, clinical presentation, review of laboratory investigations, ECHO parameters, subsequent complications and clinical outcome in study participants was studied. ECHO parameters measured were LV end diastolic dimension, LV fractional shortening and LV ejection fraction.

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**Results**

**TABLE 1: SOCIODEMOGRAPHIC PROFILE :**

| **VARIABLES** | **N (%)** |
|---|---|
| BOOKING STATUS | |
| BOOKED | 13(65%) |
| UNBOOKED/REFERRED | 7(35%) |
| AGE (IN YEARS) | |
| <20 | 0 |
| 21-30 | 16(80%) |
| >30 | 4(20%) |
| 3)ANTENATAL MOTHERS/PARITY | |
| PRIMIGRAVIDA | 5(25%) |
| MULTIGRAVIDA | 9(45%) |
| POSTNATAL MOTHERS | 6(30%) |
| 4)ORDER OF GESTATION | |
| SINGLETON | 16(80%) |
| MULTIPLE PREGNANCY | 4(20%) |
| 5)BMI(kg/m2) | |
| NORMAL(18.5-24.9 kg/m2) | 4(20%) |
| OVERWEIGHT(25-29.9 kg/m2) | 13(65%) |
| OBESE(>30 kg/m2) | 3(15%) |
| TOTAL CASES | 20 |

This table summarizes data related to maternal health, focusing on booking status, age, parity, gestation order, and BMI of antenatal and postnatal mothers. Here's a detailed interpretation: The majority of women (65%) have booked appointments for their maternal care, which indicates good healthcare engagement. However, 35% are either unbooked or referred, which suggests a need for improved access to or awareness of maternal healthcare services. Most women (80%) fall into the 21-30 age group, which is typically considered optimal for pregnancy. Only 20% are above 30 years, and there are no cases below 20 years. This reflects a potentially low rate of teenage pregnancies and more women having children in their twenties.

Around 45% of women are multigravida (having had more than one pregnancy), followed by 30% who are postnatal mothers. Primigravida (first-time mothers) constitute 25%. This balance suggests that a large portion of the women have previous maternal experience, with a significant portion currently in postnatal care. The vast majority (80%) of pregnancies are singletons, while 20% involve multiple pregnancies. While multiple pregnancies are less common, they are associated with higher risks, and monitoring these cases is important. A significant portion of the mothers (65%) are classified as overweight, and 15% are obese. Only 20% fall within the normal BMI range. This is a critical finding, as overweight and obesity during pregnancy can lead to complications like gestational diabetes, hypertension, and delivery issues. This suggests a need for interventions focusing on maternal nutrition and weight management.

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**TABLE 2: ASSOSCIATED MEDICAL AND OBSTETRIC COMORBIDTIES**

| **VARIABLES** | **N (%)** |
|---|---|
| MEDICAL COMORBIDITIES | |
| CHRONIC HYPERTENSION | 4(20%) |
| DIABETES | 3(15%) |
| OBSTETRIC COMORBIDITIES | |
| PRE ECLAMPSIA/ECLAMPSIA | 11(55%) |
| HELLP | 2(10%) |
| ANAEMIA | 10(50%) |
| TOTAL CASES | 20 |

The table highlights the significant medical and obstetric comorbidities among the study population. Notably, the high proportion of pre-eclampsia/eclampsia (55%) and anemia (50%) underscores critical health concerns

**TABLE 3: TIME OF CLINICAL PRESENTATION AND NYHA GRADING**

| **VARIABLES** | **N (%)** |
|---|---|
| 1)ANTEPARTUM (WEEKS OF GESTATION) | |
| 35-36+6 WEEKS | 11(55%) |
| 37 WEEKS AND BEYOND | 3(15%) |
| 2)POSTPARTUM(WITHIN 5 MONTHS OF DELIVERY ) | 6(30%) |
| 3)NYHA GRADING | |
| GARDE 1 | 11(55%) |
| GRADE 2 | 6(30%) |
| GRADE 3 | 3(15%) |
| **TOTAL CASES** | **20** |

-Majority of cases (55%) occurred between 35-36+6 weeks of gestation. 30% of cases occurred postpartum, within 5 months of delivery. Most patients (55%) had mild symptoms (NYHA Grade 1) and 15% of patients had severe symptoms (NYHA Grade 3)

**TABLE 4: INVESTIGATIONS**

| **VARIABLES** | **N (%)** |
|---|---|
| ECG | |
| SINUS RHYTHM | 4(20%) |
| SINUS TACHYCARDIA | 11(55%) |
| T-WAVE CHANGES | 3(15%) |
| PROLONGED QT INTERVAL | 2(10%) |
| CHEST XRAY FINDINGS | |
| CARDIOMEGALY | 3(15%) |
| BILATERAL PROMINENT BRONCHOVASCULAR MARKINGS | 1(5%) |
| PLEURAL EFFUSION | 2(10%) |
| 2D ECHO FINDINGS(LVEF) | |
| 10-20% | 2(10%) |

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| | |
|---|---|
| 21-30% | 9(45%) |
| 31-40% | 6(30%) |
| 41-50% | 3(15%) |
| **TOTAL CASES** | **20** |

Sinus tachycardia was the most common ECG finding (55%). Cardiomegaly was present in 15% of chest X-rays. Majority of patients (45%) had LVEF between 21-30% and 10% of patients had severely impaired LVEF (<20%).

**TABLE 5: MATERNAL OUTCOME AND CAUSES OF MATERNAL MORTALITY:**

| **VARIABLES** | **N (%)** |
|---|---|
| MATERNAL OUTCOME | |
| IMPROVED | 19(95%) |
| EXPIRED | 1(5%) |
| CAUSE OF MATERNAL MORTALITY | |
| CARDIAC ARREST | 1(5%) |
| **TOTAL CASES** | **20** |

High rate of improved maternal outcomes (95%) indicates effective management strategies. Low maternal mortality rate (5%) suggests quality care. Cardiac arrest remains a significant risk factor for maternal mortality, emphasizing need for close monitoring

**TABLE 6: FETAL OUTCOME**

| **FETAL OUTCOME** | **N (%)** |
|---|---|
| ALIVE | 17(85%) |
| IUFD | 1(5%) |
| NEONATAL DEATH | 2(10%) |
| CAUSE OF NEONATAL DEATH | EXTREME PREMATURITY |
| **TOTAL CASES** | **20** |

Around 85% of pregnancies resulted in live births, indicating generally good maternal and fetal health outcomes. One case (5%) of intrauterine fetal demise (IUFD) and 2 cases (10%) of neonatal deaths highlight areas of concern. These outcomes stress the importance of continuous monitoring, especially in high-risk pregnancies. The cause of both neonatal deaths was extreme prematurity, emphasizing the need for improved preterm birth prevention and specialized neonatal care to manage complications associated with premature delivery.

**SUMMARY:**

In my study period of 2 years, there were 3500 deliveries in the institution.

In my study of 20 patients,

1) 13(65%)patients are booked while the rest 7(35%) are unbooked.
2) 16(80%) patients fall under the age group of 21-30 years.
3) 14(70%) patients were antenatal mothers(all underwent Caesarean section) where as 6(30%)presented postnatally(out of which 5 had normal vaginal deliveries and 1 underwent caesarean section)
4) 16(80%) were singleton pregnancies where as 4(20%) were multiple pregnancies.

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5) 13(65% )fall under overweight BMI category.
6) 11(55%) patients presented after 35 weeks.
7) 11(55%) come under NYHA Grade 1
8) 11(55%) had assosciated pre-eclampsia/eclampsia;10(50%) had assosciatedanaemia;4(20%) had assosciated chronic hypertension.
9) 11(55%) patients had sinus tachycardia in ECG;3(15%) had cardiomegalyin CXR
10) 9(45%) patients had ejection fraction of 21-30%,2(10%) had ejection fraction of 10-20%.
11) There was 1 maternal mortality due to cardiac arrest.
12) There was 1 IUFD(5%) and 2(10%) neonatal deaths.

## Discussion

### Sociodemographic Characteristics

According to a study published in 2015 by Davis *et al.*, the majority of individuals with PPCM are over the age of 30. Demakis *et al.* discovered that multiparity and rising age were major risk factors for its development. Our retrospective study, however, noted that PPCM was common in young multigravida with meanagebeing 26 years. Multiparity and increasing age are not as critical risk factors in the Haitian population compared with western population, as studied by Fett *et al.* According to Sliwa *et al.*, PPCM is more common in (24–37%) young primigravida and white patients contrary to older and black women.

### Medical and Obstetric Comorbidities

Preeclampsia/Eclampsia (55%) was a strong risk factor for PPCMin our study, and this is similar with Agarwal *et al.* study.11 However, Prasad *et al.* found that coexisting hypertension was detected in 37% of patients at presentation, whereas preeclampsia was seen in only 25% of patients.1 A meta-analysis of 22studies published in 2013 discovered a 22% prevalence of preeclampsia in women with PPCM. It is four times more than the global prevalence.

Time of Clinical Presentation and NYHA Grading of Breathlessness: Our study found that the majority of cases presented antenatally. All cases invariably had breathlessness with the majority 55% having NYHA grade 1. A multi country study exploring clinical characteristics of patients with PPCM across Middle East, Asia, Europe, and Africa found a high proportion of patients with PPCM presenting with NYHA functional class III or IV (68.8%).13 Binu*et al.* found that dyspnea was the most common symptom at presentation in 53.7%of women with NYHA class III and 25.9% of women with NYHA class IV symptoms.14

### Investigations

Electrocardiographic findings in cases of PPCM included sinus tachycardia andnon-specific ST-T alterations with a mean EF of 34% on 2D echo. Myocarditis, presence of necrosis, and left ventricular thrombi can all be accurately diagnosed by cardiac MRI. Because peripartum cardiomyopathy has variable incidence of myocarditis, cardiac MRI cannot be used as a first-line diagnostic technique. When there is a high suspicion of myocarditis and no clinical improvement after 2 weeks of heart-failure medication, an endomyocardial biopsy may be considered. Cardiac protein assays like N-terminal pro BNP and cardiac Troponin T are not yet part of the standard management protocol for peripartum cardiomyopathy.

Maternal Outcome and Causes of Maternal Mortality PPCM has a high mortality rate,

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ranging from 15 to 50%, yet we only had 1(5%) maternal death in our study on account of management at a tertiary care center with a multidisciplinary team. Prasad *et al.* in their study had mortality of 6%. Around 10–15% maternal mortality rates were noted by Agarwal *et al.* However, the mortality rate is still considerably higher than developed countries where rates of around 4% are reported.

**Treatment Modalities**

Therapeutic management options in PPCM include standard heart failure therapy(diuretic, vasodilators, and digoxin). Anticoagulation treatment should be considered in patients with significantly depressed LVEF <35%, those with atrial fibrillation, and h/o thrombosis to prevent thromboembolic events. In our study anticoagulation treatment was added to standard management of heart failurein44% cases. Because of its activity in activating hypothalamic dopaminergic receptors and hence decreasing prolactin release, bromocriptine is thought to play a theoretical function in PPCM cases. Pentoxifylline and levosimendan are two other medicines being studied for the treatment of PPCM. Multicenter RCTs are however needed to validate the use of pentoxifylline and bromocriptine in routine clinical practice in management of PPCM.

**Study Limitations**

Exact incidence of PPCM could not be determined in view of both centres being high-risk referral care centres, and the relatively small number of cases studied.

**Conclusion**

PPCM is a diagnosis of exclusion. Aggressive medical and obstetric management is crucial for a good outcome. Even after a complete recovery, successive pregnancies entail a30% chance of relapse. Women who have had PPCM in a previous pregnancy should be extensively assessed, and those who have persistent left ventricular dysfunction should avoid additional pregnancies.

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